"NOT FINALIZED
LIMITED CIRCULATION"

SS/SSS/9
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AGRICULTURE

Outline Analysis of Agriculture Problem Area

Sudano-Sahelian Zone

Special Sahelian Office

74-19934

SECTOR REVIEW

Introduction

The attached review of the agricultural sector of the six Sahelian countries is a first attempt to analyse six major aspects,

i.e. a) the problem;
b) the significance of the sector to the economy and its relationship to other economic sectors;
c) achievements in the past;
d) objectives and targets for the future;
e) potential projects.

The review will eventually form part of a review of several sectors such as livestock, water management, infrastructure and trade, which have been recognized in the context of a medium and long-term development programme as major programme areas.

The individual sector review will allow an evaluation of the degree to which important programme areas and project objectives have been covered by the projects presented at the CILSS meeting in Ouagadougou in September 1973.

AGRICULTURE

1. The Problem

The population of the six Sahelian countries, estimated in 1972 at 25 million, is growing at an annual rate of 2.2 per cent (table 1.) Considering the fact that nutrition habits are unlikely to change in the near future, food demand can be expected to increase proportionally at least until a time when an increased per capita income will lead to qualitative changes in the food consumption pattern.

Over the past five years agricultural production has become insufficient as to the meeting of the food demand and the generating of increased cash earnings for the rural population. The average annual growth rate of agricultural production of the six countries amounted to only 1.0 per cent during the 1963-70 period and rose only slightly to 1.7 per cent during 1968-71 (table 2). During the 1963-70 period food production increased only by 0.4 per cent and rose slightly to 1.9 per cent during 1968-71 (table 2).

This situation is due to a large extent to the prevailing climatic pattern and to a multiannual drought in particular. Only 27 per cent of the total area of 5.3 million square kilometers receive as an annual average more than 500 mm. of rain, a figure which is generally regarded as the lower limit to support a permanent system of rainfed agriculture. More than 50 per cent of the area is desert, and the remaining 20 per cent is partly suitable for an extensive livestock activity but too marginal for a rainfed crop production.

As a result of an insufficient food crop production, food imports in general have risen over the past five years reaching 40.7 million dollars in 1970 (table 3).

Agriculture is still largely practiced as a subsistence economy with a relatively small proportion of the agricultural output entering the monetized part of the economy. The sector is characterized by a low productivity in

general, which is due to low incentives as far as secured market outlets and guaranteed produce prices are concerned, the absence of high yielding varieties, particularly for the main grain crops millet and sorghum, an insufficient use of farm inputs, the adherence to traditional cultivation techniques, an ineffective use of water resources and a low impact of agricultural extension activities.

This situation results in low incomes out of agricultural activities and consequently a reduced internal capital formation, saving and a low capacity for self-financing. It also explains why the agricultural sector and the rural economy in general are still a limited market for industrial products.

The production of cereals and in particular millet and sorghum is by far the most important output, not only because this subsector covers the largest part of the cultivated area and represents 65 per cent of the total value of crop production, but also because grains constitute 70 per cent of the food intake in terms of calories of the population.

A grain consumption of 120-175 kg. per capita reflects a high preference for this commodity and places these countries amongst those in the world with the highest per capita grain consumption.

In years with normal rainfall conditions grain output of millet, sorghum, maize and wheat corresponds more or less to the demand with the exception of rice, which is becoming increasingly important as an import commodity, particularly for Senegal. Mauritania's grain demand has, as a result of the particular climatic handicap of this country, outstripped the domestic production. The supply gap is met by controlled and uncontrolled imports.

The drought was not only severely felt in the field of cereal production, but also as far as certain major cash and export crops are concerned. The production of groundnut, the major cash crop for two of the six countries, has been seriously affected, too. Senegal, whose groundnut production exceeded twice during the period from 1965 to 1971 one million tons, is estimated to have produced between 450,000 to 500,000 tons in 1972-73, the lowest figure recorded during the past 20 years. Although the effect of the drought was noticable on the production of cotton, starchy roots and pulses,

the economic repercussions were less serious than for grains.

Grain imports, particularly of rice, have become more frequent and important, culminating in massive grain relief shipments in mid 1974. By August 1975, 524,000 tons of grains, of which 100,000 tons were extraordinary commercial imports, were supplied to the six Sahelian countries. This amount corresponds to 12 per cent of an average annual grain production.

In order to cope with an increasing grain demand within the subsistence and the market economy, farmers expanded in the first instance the grain crop area to zones with favorable rainfall conditions but marginal soil conditions by encroaching on pasture areas which are marginal for crop production, and by shortening the rotation cycle. Certain more profitable cash crops have replaced sorghum in some areas and have forced farmers to plant sorghum under less favorable conditions or not at all.

These steps resulted in a degradation of soil fertility and soil structure and contributed to a worsening of the already delicate balance between man, plants and soil.

Crop production and livestock production are in many areas two separated sectors with hardly any common interests as far as crop cultivators and cattle raisers are concerned. This separation, which has its social and historical reasons, does not permit either of the two subsectors to benefit from the other: crop producers rarely utilize the important potential of draught animals; cattle raisers do not benefit from the possibilities for a more rapid fattening of animals.

2. Significance of the agricultural sector to the economy and its relationship to other economic sectors

It is estimated that 83 per cent of the total labour force of the six Sahelian countries is engaged in agricultural activities both for crop and livestock production (table 1-2).

The annual value of agricultural production at current market prices amounts to about 900 million United States dollars or 40 per cent of the Gross Domestic Product.

Crop production is an important and in certain countries the most significant source of foreign exchange earnings. The export earnings of Chad are derived 70 per cent from cotton, those of Niger 60 per cent from groundnut and those of Senegal 50 per cent from groundnut, too (table 2-3).

Grains are the major staple food of the area and will remain so as a result of their adaption to the climatic conditions and the food consumption habits of the population (table 2-4).

The agricultural sector is closely related with other sectors and aspects of the economy:

Population policy and food crop production have to be synchronized in order to avoid disparities in the demand/supply situation.

The sector's productivity is a function of the effectiveness of using water resources for irrigation purposes.

Crop production can constitute an important element for the creation and development of agricultural processing industries which are so far limited to groundnut oil mills and cotton ginneries.

Despite the importance of the subsistence economy, a gradually increasing proportion of the agricultural production is entering market channels, thus stimulating and strengthening existing marketing structures and contributing to the food supply of a rapidly growing urban population.

With the gradual adoption of more advanced production techniques, agriculture is becoming a market for an agricultural input industry in the form of the supply of improved seeds, fertilizers, pesticides, farm implements and to the extent that farm management criteria justify it, also farm machines.

The lack of adequate road infrastructure has often hampered the development of potential agricultural land and has kept these areas in a state of subsistence and physically barred from the market and its stimulating effects.

There is a multiple interaction and interrelationship between

agriculture and the prevailing health conditions. Food crop production not only has a direct impact on a balanced nutrition and is decisive for the potential labour productivity; endemic diseases which are unrelated to the standard of nutrition (malaria, river blindness, bilharzia) make certain potential agricultural areas economically marginal.

There exists growing awareness and recognition of the fact that land use in agriculture has a decisive effect on environmental aspects. Measures in the field of crop rotation cycles, cropping intensity, shifting cultivation, bush fires etc., can have repercussions which may go far beyond agro-technical considerations and may affect the population of the region as a whole.

Only in the last ten or fifteen years have institutions begun having an impact on agriculture, which had been characterized before by traditional and customary laws, traditional attitudes and motives, and a relatively high degree of functionable social structure. A growing urbanization rate, an erosion of traditional social and political structures and the growing influence of a market society have made it necessary to call upon new administrative institutions to replace functions of a traditional socio-economic system which are gradually fading and to take up new functions which are inherent to a developing society. The agricultural sector's relationship with agricultural institutions and the administration in general is increasing and agriculture's role in the context of economic planning must be looked at in the broad interrelationship of economic sectors as elements which develop over a period of time.

3. Review of achievements

A very significant number of agricultural projects have been executed in the past with the assistance of bilateral aid agencies from France, U.S.A., the Federal Republic of Germany, China and others, as well as multinational (E.D.F.) and international organizations (FAO/UNDP). Their objectives were mainly aimed at an increased crop production, an increase of trained manpower and an improvement of the knowledge of specific problems (table 3-1).

The result of this work is reflected in an increase in the area of the major cash crops such as groundnuts, cotton and rice, and increased outputs with, however, very considerable fluctuations from one season to the other.

In terms of approach agriculture and specifically crop development in most of the six Sahelian countries was conceived on a crop basis rather than in an integrated form. This philosophy is based on the assumption that agricultural development can be spearheaded by certain activities - limited in number - that could contribute to a significant increase of cash earnings of the rural population. Efforts in terms of promoting crop production were, therefore, largely concentrated on groundnuts and cotton, the two major cash crops that can be grown under the prevailing climatic conditions.

While the principle of spearheading agricultural development by a crop or certain cropping practices is sound, it should have been accompanied by measures and efforts to induce farmers to apply the gained knowledge also to other crops such as cereals, which are in general less profitable but constitute the major staple crops of the area.

This latter did not materialize on a large scale and improved techniques, even those that do not require cash expenditures were rarely applied to food crops. It must also be realized that efforts aimed at the adoption of new agricultural techniques will find a receptive attitude on the side of farmers when accompanied by economic and financial incentives. These incentives in form of guaranteed grain prices and assured markets were inadequately provided by the Governments.

A policy for grain production and reserve stocks, although contemplated at various instances, did never materialize due to the failure to find the necessary substantial finances.

With the exception of the "Office du Niger" in Mali and Richard Toll in Senegal, no major agricultural irrigation project was undertaken, despite large potential areas along the major rivers Senegal, Niger and Logone/Chari.

One reason for this was again the lack of important financial resources to implement those projects and the existence of market constraints for those commodities that could be produced under irrigation conditions.

Although research activities were expanded in a very impressive manner, research subjects were very often oriented towards cash crops. Too little importance was attached e.g. to the breeding of high yielding sorghum varieties that are adapted to the particular conditions of the Sudano-Sahelian zone of West Africa. The absence of consolidated detailed agricultural census data makes medium and long term planning difficult.

While economic and financial incentives were offered - though not continuously for cotton and groundnut growers - these incentives were largely lacking for grain crops, the major staple of the area. Farmers were therefore hardly motivated to produce grains in an amount that exceeded the subsistence requirements.

4. Objectives and targets

The medium and long-term development objectives and targets of the agricultural sector of the six Sahelian countries are manifold; some of them, if realized, will have an effect over a mid-term period; all of the objectives and targets would be part of a closely interrelated medium and long-term programme.

a. Food Production

The individual consumption of the six countries lies on very similar levels as far as the total caloric intake per capita is concerned. Cereals together with starchy roots and sugar products (the latter two are not very important) constitute the source of two thirds to three quarters of the total caloric intake, which is almost twice the figure of developed nations. On a medium and long-term it will be necessary to deploy substantial efforts to reestablish and expand the level of grain supply (table 4-1). As to the protein intake, it is a recognized fact that the proportion of animal protein to the total protein intake is comparatively low, which reflects both the preference for grains and low private consumption expenditures resulting from low income. A reduction of the protein supply, as it certainly will occur during the coming years as a result of the drought, will affect the balance seriously. Upper Volta, Niger and Chad, whose average diet strongly depends on pulses in so far as protein supply is concerned, will have to make a particular effort to rebuild the plant protein supply to revert to the customary diet because animal protein will not be available in sufficient quantities or would be a commodity which people could not afford to buy (table 4-21).

The development of millet and sorghum, rice and maize as a major calory source and of pulses as an important source of protein appear to be major objectives of a medium and long-term development programme (table 4-3). A particular case is Mauri-

tania, where animal protein is most important in the context of the overall protein supply and where an important part of the caloric intake is derived from meat.

A diversification of the diet by a substantially increased production of tuber crops and vegetables would be part of a long-term plan for all of the six countries.

The potential of the six countries for the production of rice, particularly under irrigation, is considerable. As the demand for rice is steadily increasing, and as there exists a steep rise in rice imports in West Africa, future rice production on the Senegal and Niger Rivers in particular could become a major source of supply. That development is linked with major investments for multipurpose dam constructions which can be implemented only within a long-term programme.

b. Raising of income

The raising of the per capita income of the population is an important long-term objective to strengthen capital formation, saving, increased self-financing of farm investments and increased private consumption expenditures. Such an increase is possible through an overall increase in agricultural production, an increase in the marketed proportion of that production, and the implementation of crop diversification programmes with emphasis on suitable cash crops.

The problem of income raising also exists on the level of national economies. As far as agriculture is concerned this will involve a vigorous policy of crop development programmes aimed at an increase of the crop production value in general, and at an expansion of export crops and import substitution crops.

c. Preserve and improve crop production without jeopardizing environmental conditions.

The improvement and strengthening of the agricultural sector must take into account considerations which aim at preserving environmental conditions as they are needed in the interest of

the countries and the region as a whole.

This requires a careful analysis and reappraisal of the crop development policy in the six countries based on existing and new findings in the field of agrometeorology, land use pattern, population policy, distribution of population and the development of new potential areas.

These considerations are important for a mid-term plan and must be developed further to lay the foundation for a consolidated long-term programme.

d. Integration of crop agriculture and animal production.

One of the long-term development objectives ought to be a stronger integration of the crop and livestock sectors with the aim of making use of the potential of draught animals for meaningful crop mechanization schemes, to embark on cattle fattening programmes by sedentary crop cultivators, to establish cropping patterns which would allow fodder production and an improvement of the soil structure and soil fertility, to develop programmes to make use of secondary products of the crop production.

e. To increase the marketed proportion of the agricultural production.

In order to strengthen the incentives for an increased crop production, efforts must be made to improve and strengthen existing agricultural marketing systems by offering farmers guaranteed produce prices and secured market outlets.

This long-term target requires a price stabilization policy with specific price stabilization schemes, their funding and their adjustments in the light of changing demand and supply situations.

The results of such programmes would be increased cash earnings of the rural population, and a higher purchasing power for agricultural inputs as well as industrial consumer goods.

f. Education and training.

Reinforced agricultural education and training programmes should be major objectives of the medium and long-term programme.

A substantial increase of trained agricultural extension staff is necessary to reach a higher number of cultivators with advice on improved production methods.

Effective means of farmer training should be developed with preference to be given to on-farm training and job oriented forms of training.

Such a programme would entail increased investments and operations in agricultural education and training centres, the financing of operations of agricultural extension services and effective links between research centres and the agricultural extension services.

g. Supporting industries for agriculture

With clear evidence that adjusted forms of mechanization can increase labour productivity and yields, the demand for supporting industries will increase. These industries, as they exist already in a rudimentary form in certain countries, aim at providing services for the manufacture of farm tools and implements, and their repair through local blacksmiths, work shops and servicing centres.

This development must be planned in accordance with recognized needs and one should avoid time lags between the demand for such services and their availability.

The strengthening of existing and the creation of new units for the local processing of agricultural products could form part of a medium and long-term development programme.

h. Agricultural institutions.

Agricultural institutions which are expected to render services for the agricultural sector before, during and after the production process must be strengthened. This refers to research centres, statistical services, extension services, boards for the formulation of agricultural policies, agricultural planning units, services for the input supply, domestic and external marketing arrangements and price policy, agricultural processing industries and agricultural credit institutions.

i. Financing.

The assured financing of agricultural activities through long, medium and short term financial resources is a precondition for a sustained development of the agricultural sector.

Recognizing the modest capital formation and saving under the prevailing production conditions, one of the long-term objectives must be to raise capital formation and internal saving for the financing of part of the development plans. This refers to private savings and private farm investments and to measures arranged by the administration to achieve higher budgetary incomes from agriculture, as well as to external financing, which is indispensable both on a medium and long-term basis for crop production development.

j. Integration of the Sahelian zone into large economic units.

Considering the fact that the agricultural production of the six Sahelian countries is complementary to some degree to the production of the coastal countries in West Africa, long-term development targets must be formulated in the light of various considerations amongst which are the exchange of agricultural products and thus an increased trade, attempts to harmonize production policies, custom systems, prices and the strengthening of marketing channels.

5. Projects

This chapter outlines project types as they can be conceived for each of the six countries.

a. Seed multiplication.

The objective of the project is to substitute gradually higher yielding and purified seed for farmers' seed. Assuming that 10% of the annual seed requirements were met, the amount of seed need would be 9,500 tons, worth about $500,000. Seed multiplication can be organized on a national level, obtaining basic seed stock from existing research stations (Bambey in Senegal, Zaria in Northern Nigeria, Sudan).

b. Input supply and distribution.

A regular supply of farm inputs essential for an increased output, particularly of millet and sorghum, hardly exists. This includes seed, fertilizer and small farm implements. The supply of adequate fertilizers for only 1% of the sorghum area would require 17,000 tons of fertilizer worth 1.7 million dollars per year.

Existing supply organizations should be strengthened, new ones created, and an effort should be made to link input supply with the marketing of agricultural products. Such a link would allow the introduction of agricultural credit.

c. Integrated agricultural development projects

Such projects would involve a large number of small scale development activities designed to increase the agricultural production and to improve the income and health of rural communities in a defined area. Project action would consist of well construction for domestic water supplies, warehouse construction for farm inputs and farm products, package supply of seed, fertilizers, pesticides, farm implements, agricultural credit and extension services, feeder road construction.

d. Farm Grain storage.

Objective of this project type is to reduce the very substantial losses of farm products (20-30%) which occur under the present storage systems. Project action would consist of the construction and erection of improved storage systems, provision of a service for fumigating grain stocks on the farms.

e. Crop diversification projects.

The objective would be to diversity the cropping pattern in a given area byy introducing to the existing sorghum cropping other crops (cotton, groundnuts, vegetables, etc.) which have proven to be feasible as far as soil, water and climatic and labour requirements are concerned.

f. Grain reserves on regional and national level.

Based on a high grain consumption of a population of 25 million and assuming that only 2 per cent of the annual demand is kept in the form

of strategic grain reserves, 84,000 tons of grain are needed involving financing of about 34 million dollars for a revolving fund excluding investments for silos and equipment.

g. Rehabilitation of irrigation projects for rice and other cereal crops.

Rehabilitation of existing irrigation projects, strengthening their project management, and their financial structure with a view to increasing production and raising productivity of capital, area and labour.

h. New irrigation projects for crop production.

With the objective of making use of permanent and intermittent water resources for crop production and in particular cereals. (Fadama type, river diversion, pumping from rivers, groundwater lifting.)

i. Strengthening of agricultural institutions on regional and national level.

The objective of this project type is to strengthen and support existing and to establish new institutions in the field of agriculture in accordance with clearly identified needs. This refers in particular to research, extension education, agricultural marketing, agricultural credit, agricultural input supply institutions.

Regional level: -Office de Bétail (Entente)
-Entente
-WARDA
-Lake Chad Commission
-Senegal River Commission
-Niger River Commission

j. Research projects.

With the broad objective of contributing to an improved knowledge of methods of crop production which could be better adjusted to extreme drought situations.

Table 1

Population (in thousands)

COUNTRY	1965	1970	1975	1980
SENEGAL	3,490	3,340	4,281	4,797
MAURITANIA	1,050	1,173	1,327	1,516
MALI	4,480	4,936	5,530	6,257
UPPER VOLTA	4,708	5,246	5,849	6,536
NIGER	3,513	4,023	4,636	5,512
CHAD	3,307	3,571	3,904	4,310
total	20,548	22,789	25,577	28,973

Source: FAO Agricultural Commodity Projection 1970-1980, Volume II

Table 2

Average Annual Growth Rates (%)

COUNTRY	Agricultural Production 1963-70	Agricultural Production 1963-71	Food Production 1963-70	Food Production 1963-71
SENEGAL	-2.6	4.0	-3.1	4.3
MAURITANIA	2.0	1.8	2.0	1.3
MALI	0.3	2.3	0.4	3.5
UPPER VOLTA	2.1	0.5	0.3	0.0
NIGER	3.4	1.7	2.4	1.7
CHAD	0.3	-0.7	0.0	0.5
Total	1.0	1.7	0.4	1.9

Source: UNCTAD Secretariat

Table 2-1

Agricultural Population 1970 (in thousands)

COUNTRY	Total Pop.	Agricul. Pop.	Percentage in Agricul.	Total Active Population		
				Total	In Agricul.	Percentage In Agricul.
SENEGAL	3.848	2.907	76	1.705	1.288	76
MAURITANIA	1.165	991	85	363	309	85
MALI	4.923	4.485	91	2.756	2.511	91
UPPER VOLTA	5.241	4.654	89	2.921	2.594	89
NIGER	4.016	3.671	91	1.270	1.161	91
CHAD	3.563	3.251	91	1.259	1.149	91
total	22.756	19.959	87	10.274	9.012	87

Source: FAO Production Yearbook 1971 Vol. 25

Table 2-2

G.D.P. and Percentage of Agriculture

1970	SENEGAL	MAURITANIA	MALI	UPPER VOLTA	NIGER	CHAD	TOTAL
Gross Dom. Prod. $mill. Const. pr.	301	243	330	241	366	245	2,282
Per caput G.D.P.	209	211	77	45	91	69	
Per caput P.C.E.	150	99	53	40	70	55	
(Estimate) Agricul. as percent of G.D.P.	30-35	25	50	50	45	50	40
(Estimate) Agricul. as G.D.P. in mill.	270	62	190	120	165	123	930

Table 2-3

Importance of Agricultural Products with regard to Export

(per cent) in 1970

	Groundnut	Cotton	Livestock
SENEGAL	50	--	--
MAURITANIA	--	--	--
MALI	11	20	35
UPPER VOLTA	--	30	40
NIGER	60	--	20
CHAD	--	70	25

Table 2-4a

Crop Area 1971 (1,000 hectares)

	SENEGAL	MAURITANIA	MALI	UPPER VOLTA	NIGER	CHAD	TOTAL
Wheat	-----	-----	3	-----	1	5	
Maize	55	3	100	67	3	12	
Sorghum (1)	1.050	100	1.300	1.742	2.500	1.050	
Rice (paddy)	120	---	171	41	16	33	
Cereal total	1.225	106	1.574	1.950	2.520	1.100	
Sugarcane	-----	---	1	-----	1	-----	
Potato	1	---	-----	-----	-----	-----	
Sweet potato	2	3	7	17	1	12	
Cassava	40	---	10	3	29	17	
Onions	-----	---	-----	-----	2	-----	
Cow peas	90	40	-----	200	920	-----	
Other pulses	-----	---	14	130	-----	185	
Groundnuts	1.010	---	320	140	300	160	
Sesame	-----	---	-----	26	-----	40	
Tobacco	-----	---	-----	2	1	-----	
Cotton	21	---	75	96	25	283	
Total	2.379	149	2.001	2.564	3.799	1.747	12.589
total arable land	5.554	283	11.600	5.377	12.177	7.000	41.981

Table 2-4b

Production 1971 (thousand tons)

	SENEGAL	MAURITANIA	MALI	UPPER VOLTA	NIGER	CHAD	TOTAL
Wheat	---	--	4	-----	1	9	
Maize	50	8	30	42	2	20	
Sorghum (1)	650	80	900	973	1.200	715	
Rice (paddy)	170	--	150	57	40	33	
Cereal total	870	88	1.134	1.052	1.243	777	
Sugar Cane	---	--	61	-----	25	---	
Potato	6	--	-----	-----	-----	---	
Sweet potato	12	3	67	52	10	52	
Cassava	159	--	155	42	200	55	
Onion	---	--	-----	-----	30	---	
Cow peas	30	10	-----	85	150	--	
Other pulses	---	--	9	80	-----	95	
Groundnuts	960	--	170	68	240	115	
Sesame	---	--	-----	63	---	120	
Tobacco	---	--	3	8	2	---	
Cotton (lint)	10	--	25	15	4	33	
Shea nut	---	--	-----	22	-----	---	

Source: FAO production yearbook 1971 Vol. 2,

Table 3

Food Imports for Consumption (in dollars)

COUNTRY	1965	1966	1967	1968	1969	1970
SENEGAL	50.167	47.023	49.507	56.131	43.072	41.906
MAURITANIA	2.005	2.631	6.061	8.632	7.937	11.627
MALI	6.911	5.379	5.137	5.312	4.333	11.067
UPPER VOLTA	5.395	5.346	5.116	5.172	5.230	4.960
NIGER	3.694	4.305	5.411	3.713	4.530	4.618
CHAD	2.378	3.016	3.375	2.530	6.371	6.495
Total	70.550	68.205	71.607	81.540	77.528	80.673

Source: EEC Statistical Office "Foreign Trade Yearbook", Vol. I, II.

Table 3-1

COUNTRY PROJECTS
(as of 31 December 1972)

UNDP

PROJECT NUMBER AND TITLE		Executing agency	Date approved	Estimated completion date	Estimated project cost (US dollar equivalent) UNDP	Government counterpart contribution
CHAD						
CHD-68-003	Poultry production	FAO	11/68	02/73	7[illegible],100	
CHD-68-004	Agricultural statistics	FAO	11/68	09/72	65,350	
CHD-68-005	Agricultural marketing	FAO	11/68	02/72	[illegible]0,500	
CHD-69-002	Vegetable production	FAO	03/70	01/74	111,000	
CHD-69-003	Livestock development	FAO	11/70	07/73	147,000	
CHD-69-004	Direction du service des parcs nationaux et des reserves de faune	FAO	01/70	01/75	142,738	
CHD-69-005	Poultry production	FAO	04/70	01/74	123,900	23,738
CHD-69-504	Rural development of the Ouaddai, Ateche	ILO	06/69	08/73	1,004,445	1,637,976
CHD-70-001	Cotton marketing	FAO	07/70	07/72	26,500	
CHD-71-002	Afforestation	FAO	09/71	01/74	23,000	
CHD-72-001	Stockage des grains	FAO	04/72	08/72	18,500	3,500
MALI						
MLI-62-502	Improvement and Expansion of rice cultivation	FAO	05/62	01/73	1,124,103	500,532
MLI-65-503	Agricultural Instructors and extension workers training programme	ILO	01/65	07/73	1,152,480	1,121,877
MLI-65-504	Rural Polytechnic Institute, Katibougou	UNESCO	01/65	01/75	2,609,814	4,151,604
MLI-68-005	Fisheries development	FAO	12/68	01/76	181,100	
MLI-68-006	Animal production and health	FAO	12/68	01/74	107,100	
MLI-68-510	Practical rural training centres	ILO	01/68	07/74	1,333,668	1,871,460

Table 3-1 (cont.)

PROJECT NUMBER AND TITLE		Executing agency	Date approved	Estimated completion date	Estimated project cost (US dollar equivalent) UNDP	Government counterpart contribution
MALI (cont.)						
MLI-70-004	Aménagement de la faune	FAO	02/71	01/74	74,200	
MLI-71-002	Animal feeding	FAO	09/71	04/73	9,100	
MLI-71-003	Grain price stabilization	FAO	09/71	05/72	10,000	
MLI-71-51[illegible]	Rice seed multiplication centre	FAO	06/71	0 /74	6[illegible]7,410	87,690
MLI-71-523	Improvement and modernization of livestock and meat	FAO	03/71	12/76	1,3 3,450	
MLI-72-003	Recherches biologiques pour l'OCLALAV	FAO	04/72	0[illegible]/72	3,7[illegible]0	
MAURITANIA						
MAU-64-501	Agricultural Training and Extension Centre, Kaedi	FAO	06/64	01/73	997,226	1,229,983
MAU-63-005	Fisheries industry	FAO	11/63	01/73	30,000	
MAU-63-006	Agricultural production survey	FAO	11/63	01/75	112,134	
MAU-63-012	Nutrition	FAO	11/63	01/73	95,600	
MAU-70-001	Preformation rurale	ILO	0[illegible]/70	03/73	[illegible]7,300	
MAU-71-509	(Phase II)	FAO	06/71	04/75	1,091,700	1,248,776
MAU-72-002	Desert locust	FAO	10/72	09/72	3,750	
MAU-69-503	Studies for the development of the Gorgol River Basin	FAO	01/69	04/73	991,572	193,346
NIGER						
NER-63-001	Livestock improvement	FAO	11/63	01/73	49,900	
NER-69-003	Développement de l'industrie laitière	FAO	02/70	06/73	83,500	
NER-66-503	Surveys for the agricultural development of the Dallol Maouri	FAO	06/66	11/72	1,240,223	291,344
NER-70-516	Pilot agricultural development in the Dallol Maourt	FAO	06/70	01/75	1,055,100	439,823

Table 3-1 (cont.)

PROJECT NUMBER AND TITLE		Executing agency	Date approved	Estimated completion date	Estimated project cost (US dollar equivalent)	
					UNDP	Government counterpart contribution
NIGER (cont.)						
NER-71-001	Economie domestique	FAO	07/71	01/77	67,600	
NER-71-004	Matière d'industries du mil	FAO	08/71	01/73	32,[illegible]40	
NER-71-521	Feasibility study for the industrial processing of millet (Phase II)	FAO	01/71	07/73	528,010	382,528
SENEGAL						
SEN-66-508	Survey and development of pelagic fish resources	FAO	01/66	05/73	1,273,640	1,267,793
SEN-68-003	Maintenance and repair of fishing vessels	FAO	11/68	03/73	94,400	
SEN-68-004	Fishing technology	FAO	11/68	01/73	114,500	
SEN-68-005	Development of dairy industries	FAO	11/68	03/72	74,000	
SEN-68-006	Nutrition education	FAO	12/68	01/73	33,300	
SEN-68-007	Pasture improvement and utilization	FAO	11/68	01/73	31,400	
SEN-68-013	Agrometeorology	WMO	11/68	01/73	38,200	
SEN-68-511	Rural vocational training programme (Phase II)	ILO	06/69	05/72	1,329,255	1,424,249
SEN-71-510	Centre for the development of horticulture	FAO	11/71	01/75	721,400	
SEN-71-522	Development of the Casamance Forests	FAO	05/72	09/74	305,200	
SEN-72-007	Lutte contre le criquet pèlerin en Afrique du Nord-Ouest	FAO	06/72	10/72	3,750	
SEN-64-505	Institute of Food Technology, Dakar	FAO	06/64	07/74	2,057,135	946,534

Table 3-1 (cont.)

PROJECT NUMBER AND TITLE		Executing agency	Date approved	Estimated completion date	Estimated project cost (US dollar equivalent) UNDP	Government counterpart contribution
UPPER VOLTA						
UPV-6[illegible]-006	Applied nutrition	FAO	06/68	10/72	64,700	
UPV-68-007	Home economics	FAO	11/68	01/73	111,800	
UPV-6[illegible]-00[illegible]	Vulgarisation agricole	FAO	11/68	05/74	142,575	
UPV-67-507	Agricultural Training Centre, Matourkou (Phase II)	FAO	01/68	05/73	909,350	1,313,049
UPV-69-006	Agronomie du riz	FAO	05/70	01/73	67,[illegible]40	
UPV-69-007	Développement de la Pêche	FAO	10/70	10/72	47,200	
UPV-69-00[illegible]	Commercialisation	FAO	02/70	0 /72	58,100	
UPV-70-005	Radio agricole	FAO	11/70	04/73	69,100	
UPV-70-007	Coopération et crédit agricole	FAO	0[illegible]/71	11/73	70,400	
UPV-71-003	Phyllodie du cottonier	FAO	05/71	12/72	72,000	
UPV-71-006	Forestry legislation	FAO	02/72	04/73	30,000	
UPV-72-006	Inter-country expert for OCLALAV	FAO	0[illegible]/72	11/72	3,750	
INTERCOUNTRY PROJECTS						
RAF-67-097	Research into the control of grain-eating birds (Quelea-Quelea)	FAO	06/67	07/73	798,814	301,000
RAF-68-114	Development of agricultural research and its application in the Senegal River Basin	FAO	01/68	10/73	2,121,293	605,164
RAF-68-444	FAO EAC advisory group on forest industries	FAO	09/68	01/74	99,100	
RAF-68-447	Agricultural statistics	FAO	01/68	01/73	213,400	
RAF-69-146	Research on African migratory locusts	FAO	01/69	07/74	333,600	525,000
RAF-69-426	Protein rich foods	FAO	09/70	01/73	70,400	
RAF-70-434	Regional fishery statistician	FAO	04/71	01/74	69,200	
RAF-70-438	Regional TA projects on soil resources for Africa	FAO	03/71	09/72	48,400	

Table 3-1 (cont.)

PROJECT NUMBER AND TITLE		Executing agency	Date approved	Estimated completion date	Estimated project cost (US dollar equivalent)	
					UNDP	Government counterpart contribution
INTERCOUNTRY PROJECTS (cont.)						
RAF-71-186	World agricultural census and establishment of a permanent system of statistical enquiries	FAO	01/71	05/76	1,50[illegible],[illegible]00	3,377,000
RAF-71-220	West African rice development	FAO	06/71	06/74	918,[illegible]00	700,000
RAF-71-263	Livestock and animal production in Assale-Serbewel	FAO	10/71	02/74	60,000	
RAF-71-273	Fisheries development centres in Lake Chad Basin	FAO	07/72	01/73	15,000	
RAF-71-C01	Agricultural economics	FAO	09/71	01/73	37,450	
RAF-65-C61	Hydro-agricultural survey of the Senegal River Basin	FAO	01/65	11/73	3,709,[illegible]00	711,000
RAF-66-079	Survey of the water resources of the Chad Basin for development purposes	FAO	01/66	04/72	2,950,[illegible]82	128,950
RAF-70-181	Document centre for the Senegal Basin development programme	FAO	01/70	03/72	219,200	71,280

Total Caloric Intake

COUNTRY	1965	1970	1975	1980
SENEGAL	2.348	2.381	2.400	2.436
MAURITANIA	1.981	2.114	2.156	2.199
MALI	2.159	2.197	2.209	2.227
UPPER VOLTA	2.060	2.097	2.143	2.175
NIGER	2.211	2.240	2.240	2.247
CHAD	2.259	2.250	2.276	2.230
total				

Calories from cereals, starchy roots and sugar products as per cent of total

SENEGAL	73.0	73.7	73.6	73.5
MAURITANIA	62.9	63.7	63.8	63.8
MALI	79.4	79.5	79.5	79.4
UPPER VOLTA	79.0	79.6	79.5	79.4
NIGER	79.3	79.5	79.5	79.4
CHAD	73.4	74.3	74.4	74.4
total				

Source: FAO Agricultural Commodity Projections 1970-1980, Volume II

Table 4-1b

COUNTRY	1965	1970	1975	1980
Calories from proteins				
SENEGAL	11.0	11.0	11.0	11.0
MAURITANIA	14.8	14.6	14.6	14.6
MALI	12.7	12.6	12.6	12.6
UPPER VOLTA	13.7	13.6	13.6	13.6
NIGER	14.2	14.2	14.2	14.2
CHAD	13.7	13.6	13.6	13.6
total				
Calories from fats				
SENEGAL	19.6	18.9	19.0	19.0
MAURITANIA	22.7	22.5	22.5	22.5
MALI	18.5	18.4	18.4	18.4
UPPER VOLTA	16.0	15.8	15.8	15.9
NIGER	16.6	16.6	16.6	16.6
CHAD	18.0	17.5	17.5	17.4
total				

Source: FAO Agricultural Commodity Projections 1970-1980, Volume II

Table 4-2a

Protein Intake Per Caput

COUNTRY	1965	1970	1975	1980
SENEGAL	64.6	65.5	65.9	66.8
MAURITANIA	73.1	77.2	78.6	80.1
MALI	68.5	69.2	69.4	69.9
UPPER VOLTA	70.3	71.1	72.7	73.7
NIGER	78.4	79.3	79.3	79.5
CHAD	77.5	76.6	77.2	77.2
total				

Animal protein as per cent of total protein intake

SENEGAL	31.6	32.3	32.5	32.8
MAURITANIA	51.3	50.7	50.6	50.6
MALI	21.9	22.1	22.3	22.5
UPPER VOLTA	7.5	7.6	7.9	8.3
NIGER	15.9	15.7	15.7	15.8
CHAD	16.3	15.8	15.8	15.8
total				

Source: FAO Agricultural Commodity Projections 1970-1980, Volume II

Table 4-2b

COUNTRY	1965	1970	1975	1980
Animal protein as per cent of total protein				
SENEGAL	31.6	32.3	32.5	32.8
MAURITANIA	51.3	50.7	50.6	50.6
MALI	21.9	22.1	22.3	22.5
UPPER VOLTA	7.5	7.6	7.9	8.3
NIGER	15.9	15.7	15.7	15.8
CHAD	16.3	15.8	15.8	15.8
total				

Source: FAO Agricultural Commodity Projections 1970-1980, Volume II